REMARKS

Claims 1-20

Claims 1-20 have been rejected under 35 USC 102(e) as being anticipated by Freitag et al. (US6785102) [hereinafter "Freitag '102"].

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Moreover, the identical invention must be shown in as complete detail as contained in the claim. *Richardson v. Suzuki Motor Co.* 868 F.2d 1226, 1236, 9USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

Applicant respectfully disagrees that Freitag '102 meets each and every limitation of claim 1. Applicants first note that claims 1-20 are directed to tunnel junction sensors and that each claim requires first and second barrier layers. In sharp contrast, Freitag '102 does not even mention tunnel junction sensors, much less disclose associated components that would enable a tunnel junction sensor such as the claimed barrier layers. Because the claimed barrier layers are not disclosed by Freitag '102, the 35 USC 102(e) rejection over Freitag '102 is improper.

The terms of a claim must be given their plain meaning unless defined in the specification. In other words, they must be read as they would be interpreted by those of ordinary skill in the art. The Examiner, being one skilled in the art, will appreciate that plain meaning of the words "barrier layer" as used in the field of magnetic tunnel junction technology define an electrically insulating layer that allows quantum-mechanical tunneling of charge carriers to occur between ferromagnetic layers sandwiching the barrier layer. In the instant case, one skilled in the art reading the claims, which are directed to a "magnetic tunnel junction head," would interpret the term "barrier layer" as referring to electrically insulating layers that allow quantum-mechanical tunneling of charge carriers to occur between ferromagnetic layers

sandwiching the barrier layer, as opposed to conductive spacer layers as recited in Freitag '102.

In the rejection, Freitag '102's spacer layers S1 and S2 are relied on to anticipate the claimed barrier layers. However, as clearly noted in col. 5, lines 54-57, Freitag '102's spacer layers are conductive. Figs. 10-11 of Freitag '102 show these layers are copper, one of the most conductive materials known. Accordingly, those skilled in the art would not equate conductive spacer layers with barrier layers of a magnetic tunnel junction sensor.

Because the claimed barrier layers are not disclosed by Freitag '102, the 35 USC 102(e) rejection over Freitag '102 is improper. Accordingly, claims 1-20 are believed to be allowable over Freitag '102 and the remaining art of record. Reconsideration and allowance of claims 1-20 is respectfully requested.

Also, as required by MPEP Section 2111, the Examiner must give the claims their broadest reasonable interpretation in light of the specification. First, the claims themselves are directed to a magnetic tunnel junction head. As described throughout the specification, the magnetic tunnel junction head has first and second barrier layers. Further, the barrier layers are described in the specification as electrically insulating layers that allow quantum-mechanical tunneling of charge carriers to occur between ferromagnetic layers sandwiching the barrier layer, as noted on p. 5, lines 7-23 (reproduced below):

> The MTJ device comprises two ferromagnetic layers separated by a thin, electrically insulating, tunnel barrier layer. The tunnel barrier layer is sufficiently thin that quantum-mechanical tunneling of charge carriers occurs between the ferromagnetic layers. The tunneling process is electron spin dependent, which means that the tunneling current across the junction depends on the spin-dependent electronic properties of the ferromagnetic materials and is a function of the relative orientation of the magnetizations of the two ferromagnetic layers. In the MTJ sensor, one ferromagnetic layer has its magnetization fixed, or pinned, and the other ferromagnetic layer has its magnetization free to rotate in response to an external magnetic field from the recording medium (the signal field). When an electric potential is applied

> between the two ferromagnetic layers, the sensor resistance is a function of the tunneling current across the insulating layer between the ferromagnetic layers. Since the tunneling current that flows perpendicularly through the tunnel barrier layer depends on the relative magnetization directions of the two ferromagnetic layers, recorded data can be read from a magnetic medium because the signal field causes a change of direction of magnetization of the free layer, which in turn causes a change in resistance of the MTJ sensor and a corresponding change in the sensed current or voltage.

Therefore, it would not be reasonable to equate Freitag '102's conductive spacer layers with the claimed barrier layers, in light of the specification.

Thus, giving the claims their broadest reasonable interpretation in light of the specification, claims 1-20 each require first and second barrier layers. Because Freitag '102 fails to teach or even suggest barrier layers, claims 1-20 are novel over Freitag '102.

Because the claimed barrier layers are not disclosed by Freitag '102, the 35 USC 102(e) rejection over Freitag '102 is improper. Accordingly, claims 1-20 are believed to be allowable over Freitag '102 and the remaining art of record. Reconsideration and allowance of claims 1-20 is respectfully requested.

Additionally, regarding claims 6 and 15, Applicant notes that the free layer relied on in the rejection (shown in Freitag '102 Fig. 10), is 30A thick. In paragraph 3 of the Office Action, the Examiner defines the free layer as layers F1, F2, F3 of Freitag '102, which has a total thickness of 30A. This same free layer structure is also relied on in paragraphs 4 and 5 of the Office Action. Accordingly, there is no disputing that Freitag 102's free layer is 30A thick.

In sharp contrast, claims 6 and 15 each require that the free layer thickness is between about 15 and 25Å. This thickness range is not disclosed in Freitag, and so the 35 USC 102(e) rejection is erroneous.

Should the Examiner wish to discuss this matter further, the Examiner is invited to call the undersigned at (408) 971-2573. For payment of any fees due in connection with the filing of this paper, the Commissioner is authorized to charge such fees to Deposit Account No. 50-2587 (Order No. HSJ920030278US1).

Respectfully submitted,

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